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Organizations and Communities: A Symbiosis View

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Completed Research

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Abstract

How can organizations and communities engage in mutually beneficial relationships? We develop a framework that explains how an open community's engagement with an organization can be mutually beneficial to both in the long-term. We theorize how a symbiotic relationship between organizations and communities can be achieved by nurturing various forms of capital flow between organizations and communities as well as creating virtuous feedback loops within each other's capital creation systems.

Keywords

Organizations, communities, capital creation, online communities.

Introduction

How can organizations and communities engage in mutually beneficial relationships, co-exist, and co-thrive? Organizations and communities are two different organizational forms that are capable on their own to create value for their stakeholders. Organizations are often referred to as hierarchies (Coase 1937; Williamson 1975) and are fundamental in the modern business environment. However, a great deal of human collective endeavors is self-organized. Examples include markets, fisheries, and unions (Hayek 1948) and more recently various forms of online communities and coproduction collectives (Benkler 2015).

Today, organizations and communities do not exist in isolation. Different forms of engagement between organizations and communities occur (Bogers and West 2012; Reischauer and Mair 2018; Shaikh and Levina 2019). Organizations engage with communities primarily to leverage cheap and abundant external knowledge to support organizational innovation and problem-solving effort (Jeppesen and Lakhani 2010). Consequently, there are best practices to guide organizational involvement with communities (Baldwin and von Hippel 2011; Benkler 2015; Felin and Zenger 2014; Lakhani et al. 2013; Reischauer and Mair 2018; Shaikh and Levina 2019). A lesser understood aspect of organizational engagement with communities is how such interactions affect the participating communities, especially in the long-term. Communities can benefit from organizational sponsorship (Barrett et al. 2016). At the same time, there are cautionary tales that suggest that open communities are disadvantaged because organizations can easily coopt and capture the value of their work (Fitzgerald 2005; O'Mahony 2003).

This study asks the question: how can organizations and communities co-exist and co-thrive? We focus on eliciting the elements of a mutually beneficial and long-term engagement. We use the term *symbiosis* to refer to such a relationship as opposed to an *antibiosis* relationship where the community is adversely affected by the relationship. We propose a framework that broadens the conceptualization of capital to encompass social, human, economic, intellectual and symbolic forms of capital and asserts that all organizations are capital creation systems (Watson 2019). Based on prior work in organizational design and online community literature, we theorize how a symbiotic relationship between organizations and communities can be achieved by nurturing various forms of capital flow between organizations and communities as well as creating virtuous feedback loops within each other's capital creation systems. Our

framework further enables a better understanding of the role that technology plays in nurturing systems of engagement across communities and organizations for successful open collaboration.

Theory Development

The achievement of human societies stems from people's capability to work together towards achieving common goals. An organization is a group of people that coordinates the actions of its members towards achieving a system-level goal (March and Simon 1993), which implies that what organizations gain from their members' joint-action cannot be completely acquired by members acting individually. Also, members of the organization may not necessarily share that system-level goal and therefore a great deal of effort in organizational design is expended towards incentivizing members to suppress their personal goals (Puranam 2018, chap. 4) and supervising and controlling their work (Ouchi 1979).

A community is a group of people who share common interests that guide them to work together (O'Mahony and Lakhani 2011). The term community has a local and intimate connotation. Many people recognize local communities such as schools, churches, and sports clubs as places where members have frequent, deep, and strong relationships (Tönnies 1912, 1940). Today, geographic colocation is no longer a constraint. Online communities exist through computer-mediated communication (Sproull and Arriaga 2012). Regardless of the medium of communication, community members freely and willingly share their problems and solutions and often work together to provide a publicly available working products, services, and solutions (Boudreau and Lakhani 2013; von Hippel 1986; Lakhani 2016).

The Internet enabled online communities to grow extensively and become dominant novel organizational forms (Watson et al. 2005), particularly in the areas on software development and knowledge creation (Garud et al. 2008; von Hippel and von Krogh 2003). Many online communities rival hierarchical organizations in generating knowledge and creating value (Benkler 2006; Faraj et al. 2016). Examples of online capital creating communities include encyclopedias, such as Wikipedia, and open-source projects, such as the Linux operating system.

The terms organizations and communities are often used to refer to the two opposing archetypes on a continuum for which they are the extremes (Table 1). A unifying view suggests that both address the same fundamental problems of organizing but adopt different bundles of solutions (Puranam et al. 2014). First, whereas organizations have explicit system-level goals, the goals of a community are often implicit and reflect on the shared goals of their members (Sproull and Arriaga 2012). As a result of their shared goals, community members do not need strong extrinsic motivations to participate (Constant et al. 1996; Lakhani and von Hippel 2003). In contrast, employment contracts in organizations establish an economic relationship between the organization and its members. Under this contract, the organization can exercise authority over members' behavior. This control is strong but also expensive because the organization needs to invest in structures and processes for managing its workforce. In contrast, communities are mostly self-governed (O'Mahony and Ferraro 2007). However, they cannot exercise strong control of their members. For example, online community leadership is primarily driven by what the leader does for online community members rather than the opposite (Johnson et al. 2015).

	Communities	**Organizations**
Goals	Implicit, reflect on collective members' shared goals	Explicit and determined at the system-level
Incentives	Weak, mostly intrinsic	Strong, mostly extrinsic
Governance	Cheap, mostly self-governed, weak control	Expensive, professional management, strong control
Resources	Fluid, diverse, less specific	Stable, less diverse, more specific
Search processes	Indirect and mostly explorative	Direct and mostly exploitative

Table 1. Communities & organizations offer different solutions to organizing's problems

Innovation and knowledge work demand resources and processes for searching the large problem-solution space (Simon 1996, chap. 2). Because communities rely on the voluntary participation of members, their

resources are always in-flux (Faraj et al. 2011). This fluidity may first seem to be a disadvantage. However, fluidity is generative because it allows communities to improvise solutions. Throughout such improvisation, innovative solutions and new knowledge are serendipitously created (Garud et al. 2008). However, communities may not always converge and when they do their convergence can be slow and inefficient (Arazy et al. 2020; Howison and Crowston 2014; Kane et al. 2014). On the other hand, organizations operate according to decision rules that serve the organizational goals. While these rules change over time because of internal processes and the external environment, they remain focused on increasing the profitability and growth of the organization (Nelson and Winter 1973). These different search processes can explain the surprising efficiency of communities in devising solutions for hard problems (Lakhani et al. 2012; Lifshitz-Assaf 2018; Majchrzak and Malhotra 2019).

Organization-Community Engagement: Open Collaboration

In a networked society, various organizational forms frequently cooperate with each other. It is quite common for organizations and communities to actively share resources. Organizations engage with outsider individuals, groups and communities to leverage external resources and advance organizational goals (Chesbrough and Appleyard 2007; Tushman et al. 2012). To cite one example, in 2009 NASA opened its strategic R&D problems to outsiders to develop and contribute working solutions (Lifshitz-Assaf 2018). In return, problem solvers earn prizes as well as recognition of their effort. Communities also benefit from organizational endorsement and sponsorship. In open-source development, a software business might fund or contribute code to an open-source community (Watson et al. 2008).

We use the term "open collaboration" as an umbrella term to refer to various instances of organizational involvement with open communities for the purpose of value creation (King and Lakhani 2013). However, we recognize the diversity and richness in the literature. First, we recognize that open collaboration is not limited to involvement with communities but also with outsider individuals and groups (Jeppesen and Lakhani 2010). Terms such as open innovation (Chesbrough and Appleyard 2007), crowd work (Kittur et al. 2013; Majchrzak and Malhotra 2019), peer, commons, and social co-production (Benkler 2006, 2015) are often used to refer to different instances of distributed and large-scale collaboration between groups and individuals outside of confined organizational boundaries. Second, we acknowledge that various studies used other terms to refer to open collaboration instances including alliances (Shaikh and Levina 2019), sponsorships (Dahlander and Wallin 2006), and strategic governance (Reischauer and Mair 2018). Our adoption of open collaboration with communities does not negate the existence of all these variations.

Organizations need to mobilize internal and external capital to achieve their goals. In a highly competitive environment, capital gained from external collaborations such as strategic partnerships, alliances, and outsourcing initiatives is important to an organization's survival (Barnett and Hansen 2007). Open collaboration provides additional valuable complementarities to organizations. Novel knowledge and innovations are the primary resources that an organization can leverage from communities and crowds (Dahlander and Piezunka 2014; Jeppesen and Lakhani 2010; Majchrzak and Malhotra 2019; Shaikh and Levina 2019). It is only natural for organizations to seek to leverage external knowledge especially when this knowledge is abundant and almost costless (Majchrzak et al. 2018). The different quality of knowledge created by communities is also valuable. Often, innovative solutions come from peripheral and distant solvers (Cattani et al. 2017; Jeppesen and Lakhani 2010). Therefore, open collaboration enables a host organization to serendipitously exploit knowledge created by an open explorative community.

On the other hand, open collaboration is challenging because of associated risks and uncertainties (Felin and Zenger 2014). The uncertainty stems from the vagueness of the community's goals as well as the fluidity of its resources. Recruiting volunteers and community members and motivating and sustaining their participation is challenging (Ho and Rai 2017; Jeppesen and Frederiksen 2006; Spaeth et al. 2014). The abundance of knowledge poses a selection problem. As a result, quality control and the integration of outside innovation is costly (Piezunka and Dahlander 2015). Open collaboration is risky because of the weak authority of the organization on the community and its members. Open collaboration requires continuous and adaptive governance (Boudreau and Lakhani 2009; West and O'Mahony 2008). It requires the organization to nurture credibility and trust with community members (Spaeth et al. 2014). This credibility can be achieved by involving organizational members with the community (Dahlander and Wallin 2006), as well as investing in internal organizational change to accommodate the new flexible boundaries of open collaboration (Lifshitz-Assaf 2018). At best this mode of governance is influential more than controlling.

Organizations can influence communities by scoping their boundaries, steering their members, and nudging their relations (Reischauer and Mair 2018).

While successful cases of open collaboration gathered a lot of public attention and scholarly interest, there were many blunders. For example, in 2006 General Motors experimented with consumer-generated advertising by creating a web site that allows people to use the company's assets such as video clips and music to create a customized 30-second commercial for the 2007 Chevrolet Tahoe. The result was an embarrassingly large number of creative but parodic commercials (Bosman 2006; Lawrence et al. 2013). In addition to such failures, there were also many disappointing open collaboration initiatives where organizations expended significant effort but did not reach satisfactory solutions (Majchrzak and Malhotra 2019, pp. 20–23). Such cases demonstrate that although collaboration with communities is promising, it is challenging and requires a constant effort from the organization to design and govern these initiatives (Bogers and West 2012; Dahlander et al. 2019; Lakhani et al. 2013; West and Gallagher 2006).

Organizations and Communities: A Tenuous Relationship

Hierarchical organizations collaborate with open communities to leverage their products, knowledge, and creativity (King and Lakhani 2013). What do communities get in return and how are they affected? This aspect of open collaboration is less studied. Relevant scholarship falls into three streams.

One stream of work focuses on self-organized communities as holding the key for creativity, innovation, and knowledge creation (Benkler 2002; von Hippel 2005, 2017). This body of work does not dismiss organizations but rather points to the untapped promise of communities and crowds (Majchrzak et al. 2017; Majchrzak and Malhotra 2019). Online communities are capable of self-sustaining themselves and can be an effective space for innovation and knowledge creation (Faraj et al. 2016). Users and their communities create many innovations that are then later picked up and marketed by companies and firms to a wider audience. Although users benefit from freely revealing their innovations, second-mover companies often capture the largest value of these innovations (von Hippel 1986, 2005).

The second stream of work argues that communities can benefit from engagement with organizations. Organizations can provide valuable and complementary resources to communities. For example, firms can invest in the technological infrastructure as well as mobilize various stakeholders to participate in the community and integrate within a larger ecosystem (Barrett et al. 2016). There are many success stories of such win-win engagements in open-source communities (Haefliger et al. 2011). For example, the Eclipse open-source community and IBM nurtured a productive and successful collaboration that promoted the success of the Eclipse project as well as strengthened the position of IBM as a vendor of software development tools (Smith and Milinkovich 2007). Some companies donate their assets to open-source communities. For example, Netscape open-sourced its Communicator product that later became the successful mainstream Firefox browser (Mockus et al. 2002).

A third perspective is more conservative. Because organizations are goal-directed and profit-oriented, with a focus on creating economic capital, they often coopt the innovation of the communities, capture the value of these innovations, and deprive communities of valuable resources. For example, consider Freebase a former large collaborative knowledge base consisting of data composed mainly by its community members (Wikipedia 2020). The technology empowering Freebase was acquired in 2015 by Google that then subsumed Freebase content under its proprietary Knowledge Graph product and shutdown Freebase in 2016 (Pellissier Tanon et al. 2016). There are many other examples of organizations capturing the value of knowledge and products created by communities and giving them little in return (O'Mahony 2003). Community-driven open-source development is threatened when large software companies figure out how to leverage community-developed open-source products in their own business offerings (Fitzgerald 2005).

Within this debate, we do not take a normative stand towards the organization's perspective or the community perspective. We concur that open collaboration initiatives vary in their success and returns for communities and organizations. However, we note that both perspectives share the opportunities and risks of open collaboration. How then can organizations and communities co-exist and co-thrive? We contend that the relationship between these organizational forms is complex. Therefore, we adopt a systems' perspective that encompasses a broad view of capital as well as a system's view of capital creation.

Organizations and Communities: A Symbiosis View

We first review a successful open collaboration engagement between IBM and Linux in the years 1998-2002 (Baldwin et al. 2003; Mahony 2005). IBM had a prior successful collaboration with the Apache open-source community. IBM identified the opportunity to expand their market to lower-tier servers. In this market, licensing operating systems from Microsoft and Sun was not an option. IBM considered the Linux open-source operating system but lacked the in-house expertise to support it as well as feared the community resistance to support IBM hardware. IBM made the strategic decision to have their own developers contribute to the Linux project. Individual developer contribution mitigated the risk of the community perceiving a risk from a big company like IBM. Over time, IBM developers gained legitimacy within the Linux community and expertise with the Linux project. This enabled IBM to bundle the Linux within its server offering. This open collaboration is widely credited as an incredibly successful strategy for IBM with estimated profits on the order of $1-2 billion in revenue in 2002 (Baldwin et al. 2003).

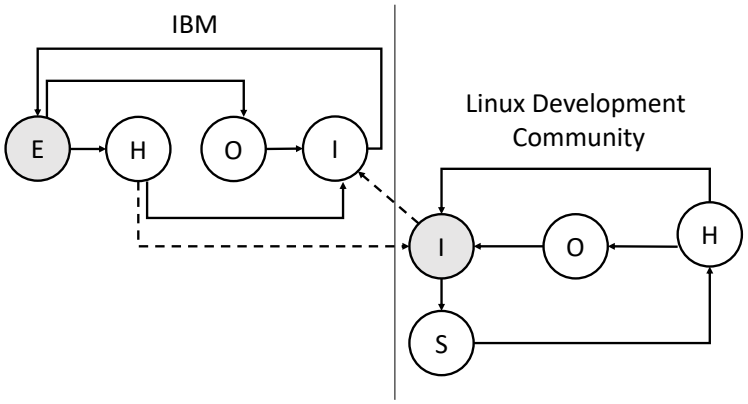

Figure 1. The capital creation systems of IBM and Linux integrate economic (E), human (H), organizational (O), intellectual (I), and symbolic (S) forms of capital

The success of collective work demands the availability of multiple resources or *different forms of capital*. For an economist, capital is a durable and transforming factor of production generated by a prior investment (Marshall 1890). This broader view of capital can be broken into economic, human, natural, organizational, social, intellectual, and symbolic capital (Watson 2019). Economic capital includes financial and physical assets such as manufactured goods. Human capital refers to the skills, ability, knowledge, and creativity of human workers. Natural capital includes natural resources and the rights to use them. Organizational capital refers to institutionalized knowledge and codified experiences. It is capital that belongs to or resides within the organization and is not physically tied to a particular geography. Social capital is the ability to benefit from social connections. Intellectual capital is codified knowledge artifacts. Finally, symbolic capital refers to the image, status, and prestige associated with individuals and groups.

The different forms of capital and productive interaction among them are needed for organizations to reach their goals and for communities to realize the collective goals of their members. The existing definitions of organizations already imply that different forms of capital need to be in place. First, organizations exist to pool together the human capital of their members to reach goals beyond an individual member's reach. The skills, knowledge, and creativity (human capital) of organizational members are essential ingredients for the success of knowledge-creating (intellectual capital) organizations. In a typical organizational setting, workers are compensated for their time and effort, which requires the availability and expenditure of economic capital. Organizing the work, dividing and allocating tasks, monitoring and controlling performance requires the availability of organizational capital in the form of routines and procedures, as well as the human capital of managers and executives.

Communities too depend on human capital. The success of communities requires recruiting highly skilled and committed members. However, in contrast to organizations, members are not usually economically compensated. Instead, various forms for rewards drive members voluntary participation. Intrinsic motivations include the sense of accomplishment and enjoyment of doing one's work of interest and working with like-minded individuals on projects of interest. The ability of communities to provide their

members deep and personal connections is a key advantage of communities. Social capital is, therefore, an important form of capital that communities leverage and create. Skilled people can be attracted to a community by the network they can join, social capital, and the ability to learn and improve their human capital. Some communities, such as Linux, have generated high levels of symbolic capital, and this can attract human capital, who inherits some of a project's symbolic capital when they participate in it.

In order for organizations and communities to achieve their goals, they need to combine and convert these forms of capital through *a capital creation system* (Figure 1). For example, a software development company requires economic capital to hire skilled developers (human capital) and create organizational processes and structures for them to work together (organizational capital) to develop software products (intellectual capital) than can be then sold to customers (economic capital). In a profit-seeking company, economic capital is the target output of the capital creation system. An open-source community also requires skilled developers to work together to create software. However, developers join the collective effort without direct compensation. They also elect organizational leaders and design processes (organizational capital) to govern their work. Intellectual capital is the target capital of an open-source community. A successful software product such as Linux can garner recognition and prestige (symbolic capital) to its community and provide skills (human capital) sought by hierarchies deploying open-source software. This ability to generate human, social, and symbolic capital provides a strong incentive for existing members to sustain their efforts, and also attracts new members.

In sum, organizations and communities are capital creation systems that require and integrate various forms of capital. Within this framework, open collaboration can be thought of in terms of mutually beneficial capital exchange resulting from the loose integration of two distinctive capital creation systems. For example, NASA's open-tournament can be thought of as the acquisition of human capital of external problem solvers in the exchange of economic capital in the form of the prizes offered for satisfactory solutions and symbolic capital of being affiliated with work with NASA, especially for the prize winners.

A symbiotic relationship is a mutually beneficial and long-term engagement between an organization and a community. First, it is a relationship where both the organization and the community can provide complimentary capital to each other. The term value capture which is often used in some studies of open innovation implies an antibiosis exchange where one party gains something at the expense of the other. For example, many technology companies leverage open-source infrastructure software without giving anything tangible in return. Embrace, extend, and extinguish is a common strategy employed by software companies to subsume open-source software and standards within their offering (Woodard and West 2011). Open-source communities have little to defend except for setting up licensing terms that force companies using their software to contribute their extensions back. However, these license agreements are very broad, easy to circumvent, and costly to enforce (Gomulkiewicz 2009, 2011; Wen et al. 2013).

Second, in addition to the mutual exchange of capital, a symbiotic relationship does not deprive the community of valuable capital. The exchanged capital should not be rivalrous especially when it is scarce. A prime example of the exchange of rival capital is hiring critical community members. In many communities, participation follows a power-law distribution (Johnson et al. 2014). Many communities are sustained by a few individuals (Crowston and Howison 2005). Organizations often seek to hire these highly skilled individuals to leverage this human capital to achieve better integration with community-developed products. Such hiring can deprive communities of valuable resources of creativity and leadership. This risk can be mitigated with the sharing of the rivalrous capital can such as when a community leader joins an organization and is budgeted time to support the community. In contrast, the exchange of intellectual capital of non-rivalrous digital assets such as source code does not deprive either party of crucial capital.

First-order symbiosis proposition: symbiotic open collaboration involves a mutual exchange of non-rivalrous capital between the organization and the open community.

The success of open collaboration depends not only on a mutual capital exchange between the community and organizations but also on the long-term sustenance of this relationship. The first-order symbiosis is transactional and assumes that the exchanged capital serves the capital creation systems of both parties. However, the exchange itself opens up the opportunity of both parties to extend their capital creation systems. We refer to this relationship as second-order symbiosis. The IBM-Linux example illustrates how the relationship extended both parties' capital creation system. The intellectual capital (Linux operating system) expanded IBM's offering and thus opened up new markets especially in the lower-tier hardware.

This translated to more economic capital and thus the capacity of IBM to further nurture its investment in Linux and other open-source software. Similarly, the Linux community benefited from IBM contributions. The improved intellectual capital served to improve the recognition of Linux as a legitimate operating system. This symbolic capital serves to further motivate the community members and recruit new members.

Within the context of software development, there are many other opportunities for symbiotic open collaboration. For example, many software development companies open the source code of their products. In return, they receive the human capital of skilled volunteer developers who can further improve the software. This relationship is not a one-time exchange but rather creates a virtuous interaction: human→intellectual→economic in the organization, and intellectual→symbolic→human in the community. In this example, intellectual capital and human capital are the fulcrum points of the relationship. By sharing organizational capital in the form of documented source code, the organization imbues the community with additional symbolic capital, that attracts human capital, who further develop organizational capital that the organization can convert to economic capital.

The organization and the community can be effectively thought of as one super-entity that has an elaborate capital creation system resulting from this symbiosis. It enables the organization to focus on marketing software services and the community of managing software projects. To persist, the capital productivity of the symbiotic relationship must be greater than the capital productivity of competing entities. Second-order symbiosis allows organizations and communities to integrate their capital creation systems to meet their different capital creation goals. It expands the efficiency and effectiveness of their joint capital creation system by merging the capital creation system of each party while maintaining separate legal entities.

Second-order symbiosis proposition: symbiotic open collaboration raises the productivity of the capital creation systems of both the organization and the community.

Conclusion and Contributions

Communities fill in space between and complement firm-based and market-based production depending on the resource space, the problem space, the communication costs and design costs of the innovation (Baldwin and von Hippel 2011; Benkler 2015). Existing studies propose that communities are superior to organizations for the identification and allocation of creativity (Watson et al. 2005). Other studies point to the opportunity to re-design organizations for the knowledge economy (Majchrzak et al. 2018). Notwithstanding these opportunities, an ecosystem approach rather than new organization design remains the dominant organizational logic (Yoo et al. 2010). Our capital creation system framework contributes to understanding how hierarchical organizations and open communities can co-thrive in open ecosystems of innovation. Future work will empirically use the framework with multiple cases of open collaboration.

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